OBJECTS STRUCTURE ELECTROMAGNETIC CONTROL

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In modern industry, transport, energy and construction, the need for accurate control of materials and structures without damaging them is increasingly growing. This is necessary for timely detection of defects, prevention of accidents and ensuring long-term operation reliability. This is especially important in critical industries, where even a slight change in the material structure can lead to serious consequences. One of the most promising methods of non-destructive control is electromagnetic control.

This method is based on the principle of interaction of the electromagnetic field with the material of the object of study. Under the influence of an alternating electromagnetic field, eddy currents arise in conductive bodies, magnetic fields change, and these changes can be accurately recorded. If the material has any defects - cracks, cavities or foreign inclusions, then the electromagnetic response will be changed. Thus, it is possible not only to detect changes in the structure of the material and the presence of defects, but also to estimate their depth, size and nature. Usage of electromagnetic control is also possible to measure the thickness of the material, coatings peeling, and find internal inhomogeneities. This method is often used in automated lines for paint layers thickness control, electroplating and non-metallic coatings.

Electromagnetic control has a number of significant advantages. The most important is complete non-destructiveness. The study can be carried out without dismantling or damaging the product. This method is also fast and allows to get a real time results. It can be used even for objects with complex geometry or in conditions of limited access. In addition, it does not require direct contact with the surface - control can be carried out through the coating, paint or varnish. Devices used in electromagnetic control can be stationary and portable, which is very convenient in field conditions.

Electromagnetic control continues to improve and will remain one of the most important technical diagnostics tool in the nearest future. Main advantages are versatility, accuracy, speed and adaptability. It is indispensable in both production and research conditions. Taking into account the trends towards automation, digitalization and the creation of «smart» control systems, the electromagnetic control method has the potential for further breakthroughs in the field of safe and efficient operation of technical systems.

References:

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